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ABSTRACT

This article hypothesizes that language repetition of young children (in the sense used by Kobashigawa and Snow) does not help language acquisition. The evidence comes from the results of a prior study in which no indication was found that mothers who repeat themselves a great deal have children who acquire language more quickly. However, non-correlations may occur because there is no relation between the variables. In the present study the relationship between repetition and language growth is examined inferentially, by examining the short-term consequences of repetition on comprehension. In particular, a premise of the repetition hypothesis is examined: according to the hypothesis, the child must process repetition sequences as repetitions, rather than as sequences of unrelated utterances. On the basis of two studies, one naturalistic and the other experimentally controlled, the child gives no evidence of responding to repetitions as repetitions. It is concluded that it seems unlikely that repetition per se could have a beneficial effect on language acquisition. (NCR)

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MATERNAL SELF-REPETITION AND THE CHILD'S ACQUISITION OF LANGUAGE[1]

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Several investigators have noted that mothers speaking to young children repeat themselves; that is, they produce partial or occasionally exact renditions of their own immediately preceding utterances. Kobashigawa (1969) and Snow (1972) report that approximately one-fourth of all utterances from mother to child are repetitions of this kind. Since maternal self-repetition occurs precisely when the child is acquiring language, it has been hypothesized that repetition might have a beneficial effect on the acquisition process. We will call this "the repetition hypothesis."

For example, Snow (1972) has noted that repetitions present the same meaning in a series of slightly different surface forms. She has hypothesized that this could be a valuable demonstration of basic features of the language. In addition, Snow has suggested that repetition may increase the child's chances of successfully processing a sentence, e.g., by giving him an opportunity to decode minor constituents he may have missed on first hearing.

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We agree that mothers repeat themselves (Newport, 1977; Newport, Gleitman & Gleitman, 1977). Nor do we doubt that children sometimes learn by repetition, as in acquiring classically or instrumentally conditioned responses and various motor skills. The question is whether repetition in the sense used by Kobashigawa (1969) and Snow (1972) helps language acquisition in young children. We believe that it does not. One line of evidence comes from the results of a prior study in which we found no indication that mothers who repeat themselves a great deal have children who acquire language more quickly (Newport et al., 1977). However, noncorrelations may occur for a variety of reasons, only one of which is that there is in fact no relation between the variables. In the present study we therefore examine the relationship between repetition and language growth by a different procedure; we look at this relationship inferentially, by examining the short-term consequences of repetition on comprehension. In particular, we examine a premise of the repetition hypothesis: according to this hypothesis, the child must process repetition sequences as repetitions, that is, as different from sequences of unrelated utterances. On the basis of two studies, one naturalistic and the other experimentally controlled, we will argue that the child gives no evidence of responding to repetitions as repetitions. It therefore seems unlikely that repetition per se could have a beneficial effect on language acquisition.

Study 1

Method

In this study we visited three mother-child pairs. The children ranged in age from 15 to 20 months, with MLUs of 1.00 to 1.36. We merely asked the

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mothers to tell their children to do things; the mothers themselves produced spontaneous repetition sequences. As reported by other investigators (Kobashigawa, 1969; Snow, 1972), most of these repetitions were not exact but partial repetitions, i.e., paraphrases. We defined a repetition sequence as the entire set of consecutive (or nearly consecutive) utterances in which the mother requests the same response from the child. Two coders identified repetition sequences from the transcripts of maternal speech with an inter-rater reliability of .98. Within each of these sequences we considered each of the utterances a trial, that is, the first utterance in the sequence is trial 1, the second trial 2, etc. From our spontaneous corpora we obtained 82-167 repetition sequences per mother, ranging from one to about 15 trials per sequence. The end of a sequence was of course determined either by when the child responded correctly, or when the mother gave up.

Scoring

What is the appropriate measure for determining whether repetition has a beneficial effect on the child's responding? One possibility is the cumulative probability of response over repetitions (cf. Benedict, 1976). This measure asks whether the probability of response is greater if the mother says something, say, three times than if she says it once. Unfortunately, cumulative probability will by definition increase with the number of trials; but it will not distinguish a true learning effect from random responding on each trial. Suppose there is a true learning effect over trials, so that the child has acquired information on trials 1 and 2 which improves his response on trial 3. This will result in increased responding as trials proceed. Suppose on the other hand that the probability of responding is actually the same on any trial. This too will produce a curve of increasing responding with increasing trials. But this second function is not a true learning curve. The increased responding here is simply an effect of an increase in the number of chances the child has to respond. Thus cumulative probability is a faulty measure with which to test the hypothesis at hand.

The appropriate measure for testing the hypothesis is the conditional probability of response: the probability of a response on any trial, given that there was no response on preceding trials. To say that there is a learning effect is to say that this conditional probability increases over trials. To compute this measure we score the proportion of trial 1 utterances to which the child responded, then discard all sequences to which a response was made on trial 1 and score the proportion of trial 2 utterances to which there was a response, and so on. Figure 1 presents two theoretical curves of the conditional probability of response across repetition trials. As this figure shows, if every utterance is responded to with some constant probability, the conditional probability over trials in a repetition sequence should be flat, as in the solid line. On the other hand, if there is a learning effect of repetition, the plot should increase over trials, as in the dotted line. That is, on this hypothesis, the probability of a response on a given trial should be equal to the probability of a response to any single utterance (= probability of

Figure 1. Theoretical curves of conditional probability of response across repetition trials

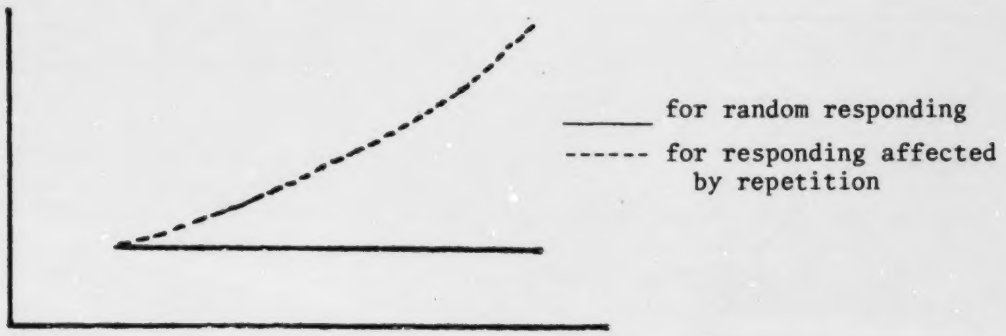


Figure 2. Mean and range of conditional probability of the child's response across repetition trials N = 3

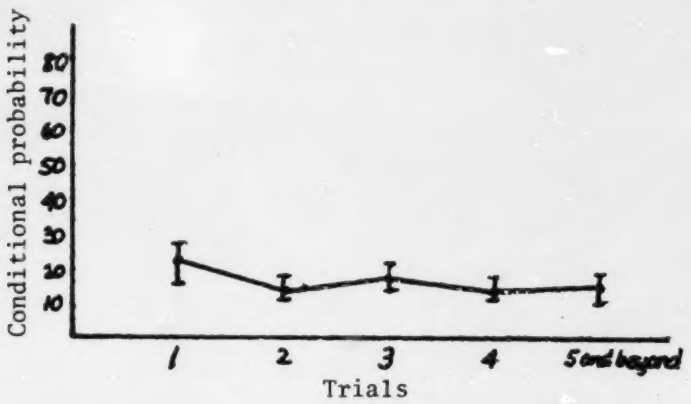


Table 1. Examples of a repetition sequence and a pseudorepetition sequence

Repetition sequence	Pseudorepetition sequence
Give the dog to the monkey.	Give the dog to the monkey.
Will you give the dog to the monkey?	Will you give the car to the frog?
Where's the dog? Give it to the monkey.	Where's the rabbit? Give it to the clown.
Can you give the monkey the dog?	Can you give the boy the fish?
Give the monkey the dog.	Give the mouse the ball.

response on trial 1) plus some additional probability that comes from having learned something on previous trials of that same command.

Results

Figure 2 presents the mean conditional probability of a fully correct response over trials in the repetition sequences. As the figure shows, the conditional probabilities do not increase over trials [$F_{linear}(1,2) = .99$, NS]. For these spontaneous repetitions, the child's conditional probability of response stays roughly the same, regardless of his mother's self-repetitions. In short, there evidently is no learning effect.

Study 2

There are some alternative interpretations of the results of Study 1. To begin with, the children were one- and early two-word speakers. In such young language-learners, comprehension may be limited to short stretches of the speech stream (e.g., one utterance). These children may not yet be capable of integrating information across sequences of utterances and may thus have been the wrong population on which to test the repetition hypothesis. Furthermore, the mothers themselves decided what to say to the children. If they chose requests or commands the children comprehended easily, the probability of a response might depend only on the child's random obstinacy. We therefore conducted a second study, with somewhat older subjects, and with commands that we controlled in difficulty and in the type of response asked for.

Method

The subjects in this study were six mother-child pairs. The children ranged in age from 19 to 32 months, with MLUs of 1.35 to 2.15. All mother-child pairs were visited at a presession to familiarize the mother with the procedure, to measure the child's MLU in spontaneous speech, and to determine a set of toys whose names the child knew. One mother-child pair was eliminated from the study after this presession because the mother could not produce utterances from a script in a natural-sounding manner.

At all other sessions, the mothers delivered sequences of utterances to their children from a prepared script. The nouns included in these scripts were those the child understood in the presession. The scripts consisted of 48 randomly ordered sequences. Twenty-four of these sequences were repetition sequences, each including five utterances which were partial repetitions of one another; all utterances in a sequence requested the same response from the child. These repetition sequences thus mimicked as much as possible natural maternal sequences. The sequences were divided among three command types (action, location, and dative), each at two levels of difficulty (easy action: "Jump."/hard action: "Make the dog jump;" easy location: "Where is the ball?"/hard location: "Put the ball on the table;" easy dative: "Gimme the ball."/hard dative: "Give the ball to the dog."). There were four different repetition sequences of each of these six types.

In addition, we wished to control for possible artifactual effects of repetition. First, utterances within a repetition sequence are not exact repetitions of one another; rather, they are paraphrases which differ slightly in syntactic form. We therefore needed to control for the possibility that some syntactic forms may be easier than others. Second, we wished to control for any artifactual effects of extended "nudging." One might find an effect of repetition on the probability of response merely because continued speech, even if semantically unrelated, "gets the child going." To control for such possibilities, we included 24 pseudorepetition sequences. These pseudorepetition sequences were matched to the repetition sequences in syntactic form; but in pseudo-repetition sequences, unlike repetition sequences, the nouns and/or verbs (and thus the correct response) were changed from one trial within a sequence to the next. Table 1 gives an example repetition sequence and its matched pseudorepetition sequence. Comparison of the probability of responses to repetition vs. pseudorepetition sequences would allow us to determine whether there is an effect of repetition per se.

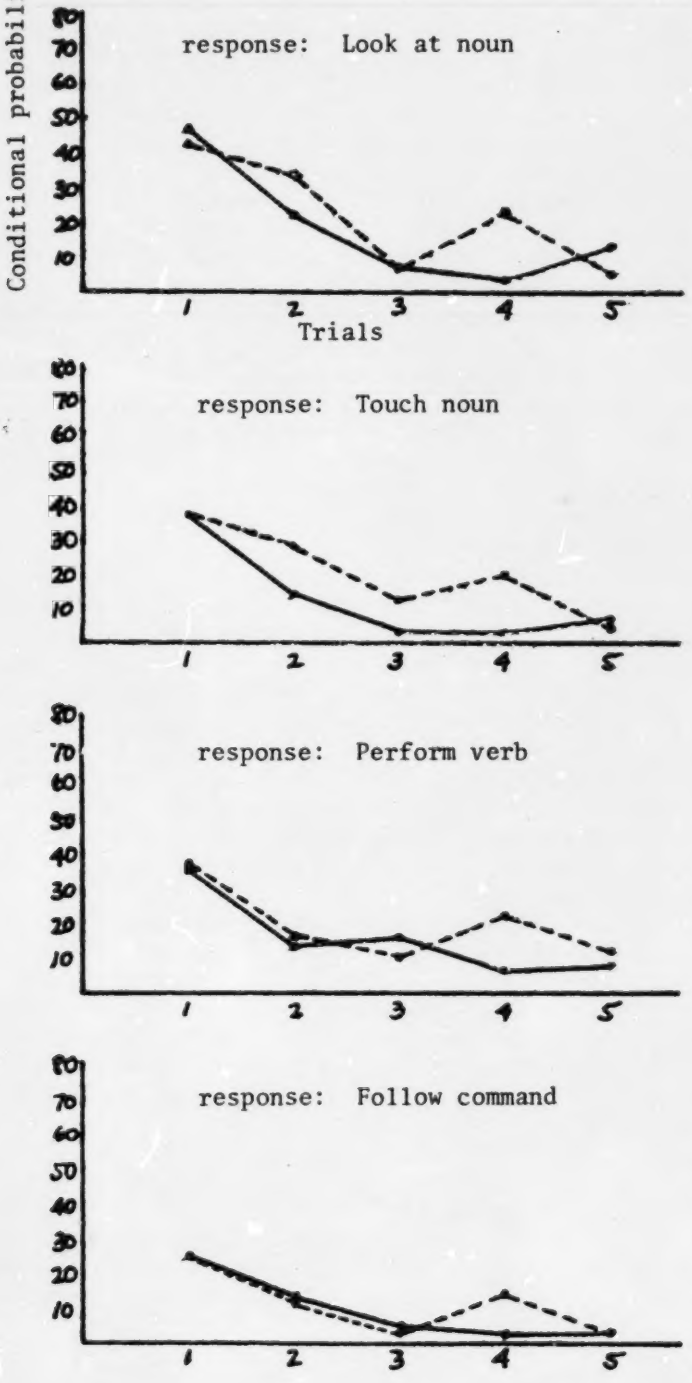
The 48 sequences were delivered in random order, in as natural a fashion as possible, over three to seven sessions per child. A sequence was begun by getting the child's attention, e.g., by calling his/her name. Utterances within a sequence followed one another at five second intervals, to allow time for the child to respond. Two experimenters were present at all sessions to time the mothers' delivery and to record all responses of the child. A sequence ended either when a correct response was made, or when the fifth utterance in the sequence was completed. The next sequence was begun when the child was again attentive; i.e., there was a variable amount of time between sequences. Sessions ended when the child no longer attended.

Results

In this study, all scoring of responses was performed on each of several response criteria: looking at the object named, touching the object, performing the requested action (regardless of whether the action was performed on the correct object), and performing a fully correct response. A 2(repetition vs pseudorepetition) X 2(levels of difficulty) X 5(trials) X 6(subjects) repeated measures ANOVA was performed on the conditional probability of a response for each of the response criteria. Computation of these probabilities was as in Study 1. Figure 3 presents the conditional probability of a response, presented separately for each of the four response criteria. Since there were no effects of difficulty, the probabilities are collapsed over easy and hard command types. The mean probability over trials in the repetition sequences is compared within each figure to the mean probability over trials in the pseudorepetition sequences.

First, let us consider the probability of responding to repetition sequences. For all response criteria, from a partial response, like looking at the object, to a completely correct response, there is no indication whatever that repetition leads to an increased probability of response as predicted by the repetition hypothesis. In fact, for both

Figure 3. Mean conditional probability of the child's response to repetition and pseudorepetition trials N = 6 ——— repetition ------ pseudorepetition



repetition and pseudorepetition sequences, response rate declines over trials [for a main effect of trials, $F(4,20) = 6.92, 8.00, 5.06, 4.63$ for the four response criteria, all $p < .01$]. This is apparently an adaptation effect to continued urging. There are no differences between responding to repetition sequences and responding to pseudorepetition sequences.[2] In short, there is no evidence that children learn from repetition, or that they respond to repetition sequences differently from sequences of unrelated utterances.[3]

We have thus found no evidence to support the repetition hypothesis. However, Benedict (1976), in a recent and very interesting thesis on comprehension, cites results that appear to contradict our findings. Benedict hypothesized that repetition enables the child to respond correctly to more parts of an utterance, thereby facilitating comprehension. She compared attention and accuracy of response to repeated commands with those to the same commands said only once. Unfortunately, as Benedict herself points out, such a comparison confounds the effects of repetition with a mere increase in the number of chances the child is given to respond. Her data can therefore be criticized on the grounds that she used a type of cumulative, rather than conditional, probability measure. On the other hand, as support for the repetition hypothesis, she offers a new kind of evidence which is not subject to the same criticism.

Benedict performed an internal analysis of the child's responses to exact repetition sequences and found that some sizeable proportion (14%)[4] of repetition sequences showed increasingly complex responses over trials. For example, the child may pick out and respond to one element of utterance one (e.g., the noun), then respond to two elements of utterance two (e.g., the noun and the verb), and finally respond to three elements of utterance three or four. For the repetition sequence of Table 1, this might mean: after utterance one, the child touches the monkey; after utterance two, the child touches the dog as well as the monkey, or gives something to the dog; etc. This increasing complexity of partial responses over trials suggests that the child may be learning from repetition. Furthermore, if this were the benefit of repetition, our previous measures would not discern it: our measures thus far have been on only one response criterion at a time, not on changing responses over the sequence. We therefore returned to our repetition and pseudorepetition data from Study 2 to look for such increasing responses.

In fact, we found that an average of 13% of the repetition sequences showed increasing responses, just as in Benedict's data. But an equal or slightly greater proportion of the pseudorepetition sequences (16%) showed increasing responses as well. Since utterances in pseudorepetition sequences each requested a different response from the child, analysis of these responses to pseudorepetition sequences allowed us to determine precisely which utterance, or piece of utterance, the child was responding to. In fact, the increasing responses to pseudorepetition sequences, and therefore presumably the increasing responses to repetition sequences as well, were of three kinds. First, there were simple response lags: the child responded in a more complex way to utterance 1 after several

seconds, and therefore after several intervening utterances, than he did immediately after utterance 1 was spoken. Second, there were "nudge" effects: the child responded in a more complex way to utterance 3 than he did to utterance 1, regardless of whether the intervening utterances were related. Finally, some of the increasingly complex responses to pseudorepetition sequences were in fact additive across utterances. Here is one example of an additively increasing response produced by one of our subjects to the pseudorepetition sequence of Table 1:

Give the dog to the monkey.	(C looks around, picks up the monkey)
Will you give the cat to the frog?	(C looks around)
Where's the rabbit? Give it to the clown.	(C looks around)
Can you give the boy the fish?	(C picks up the rabbit [noun of trial 3])
Give the mouse the ball.	(C picks up the ball [noun of trial 5], looks at the mouse [noun of trial 5], gives the ball to the rabbit [noun of trial 3])

In short, we find that Benedict is quite right in general about increasing responding: children sometimes do respond in a more complex way over sequences of utterances. But they do this regardless of whether the sequences of utterances are in fact repetitions of one another.

In sum, whether we examine partial or complete responses, in spontaneous sequences or experimentally contrived ones, the child shows no evidence of processing repetition sequences as repetitions (i.e., as different from unrelated utterances). These results make it highly implausible, at least for children between the ages of 1-2 1/2, that repetition per se has any beneficial effect on language acquisition.

If this is true, why does the mother continue to repeat herself? We believe it is because repetition overall (that is, in terms of cumulative probability) has a greater likelihood of getting the child to drink his juice or take his foot out of the clean laundry. The child is more likely to respond if the mother says something six times than if she says it once, not because of the instructive effects of repetition on comprehension, not because the child is more sophisticated at processing the utterance after six times, but merely because it gives the semi-adequate responder six chances.

Footnotes

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[2]On one response criterion (looking at the object), there is a significant interaction between repetition vs. pseudorepetition and trials [$F(4,20) = 5.65$, $p < .01$]. This interaction fails to reach significance on the other three response criteria [$F(4,20) = 2.66, 1.31, 2.31$, all NS]. This interaction is due entirely to a mysterious increase in the probability of a response to the fourth trial in pseudorepetition sequences.

[3]As an alternative view, it has been suggested to us that this apparent non-effect of repetition could in fact be a combination of two opposing functions: (1) a positive effect of repetition; and (2) a changing probability of response over trials due to an item selection effect (cf. Underwood, Rehula, and Keppel, 1962). The latter function would result if the subjects were more likely to respond to easy utterances earlier: (2)A. In the case of repetitions, the average difficulty of the utterances would increase across trials, since utterances receiving no response (i.e., difficult utterances) are the only ones continued to the next trial. (2)B. In the case of pseudorepetitions, the item-selection effect would be exactly the opposite, and average difficulty of the utterances would decrease over trials. On this view, the probability of a response to later utterances in repetition sequences would be significantly lower than the probability of a response to later utterances in pseudorepetition sequences, were it not for a positive effect of repetition.

For several reasons we do not consider this possibility seriously. First, this view must make the improbable assumption that in the case of repetitions the two hypothetical functions (1 and 2A) are of the same magnitude, in order to cancel one another exactly. Second, even if an item selection artifact were present in the comparison of repetitions with pseudorepetitions, it could only reside in the difficulty level of the nouns. (In all other respects, repetition and pseudorepetition sequences are matched.) However, since all the nouns selected for this study were comprehended by children in the pretest, any differential difficulty of the nouns must be within a small range above the level of comprehension. Therefore, although it is not possible to rule out empirically the existence of an item selection artifact, we feel on logical grounds that its effect (if there is one) would be so small as to be negligible.

[4]Benedict reports that 41% of all repetition sequences receive some response; of these, 64% show changes in response with each repetition; and, of these, 54% are additive changes. In short, this works out to 14% additive changes in response to repetition.

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